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(54) **Heat treatment method and device.**

(57) A heat treatment device according to the present invention comprises a handling chamber (1) including a carriers feed in/out opening (8) for carriers holding plural sheets of objects to be treated parallelly vertical, and housing a vertical heat treatment furnace (2) for heat treating the objects to be treated; posture changing device (9) disposed in the handling chamber (1) and near the carriers feed in/out opening (8) for swinging the carriers near the carriers feed in/out opening (8) of the handling chamber (1) on a rotational center (X) into a territory of lower sides of the carriers to change the posture of the objects to be treated from the vertical position to the

horizontal position; a carriers storage unit (49) disposed above the posture changing device (9) and being capable of storing a plural number of the carriers (7) whose posture has been changed; conveyor (51) for conveying the carriers between the carriers storage unit (49) and the posture changing device (9), and the side of the heat treatment furnace (2); and transfer device (52) for transferring the objects-to-be-treated to/from an objects-to-be-treated holder (5) for loading and unloading into/out of the heat treatment furnace (2) the carriers conveyed to the side of the heat treatment furnace (2). The posture changing device (9) changes the posture of the

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carriers so that the carriers (7) are swung down on the rotational center (X) to a territory of sides of the carriers (7) so that the objects to be treated (W) have the posture changed from the vertical position to the horizontal position, whereby the carriers (7) can have the postures changed along a swing track of a minimum radius with small bulge amounts and a minimum moving amount. Accordingly the posture

change of the carriers (7) is quick, and a small space can allow the carriers (7) to have the postures changed without interference with the conveyor. A conveying distance and a conveying time for conveying the posture changed carriers (7) to the upper storage unit (49) can be reduced, and the heat treatment device (2) can be smaller-sized and have improved processing efficiency.

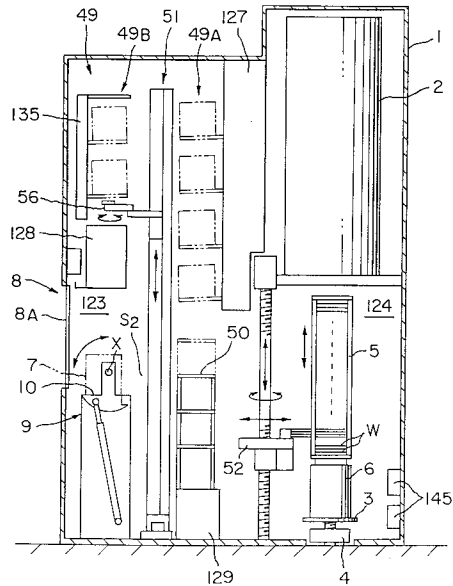


FIG. 1



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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US-A-5 110 248 (ASANO ET AL) 5 May 1992 * column 2, line 3 - column 2, line 34; figure 1 * ---	1,3,4	H01L21/00
A	US-A-5 181 819 (SAKATA ET AL) 26 January 1993 * column 1, line 44 - column 2, line 32; figures 1,4 * ---	1,3,9-11	
X A	US-A-5 261 167 (SAKATA) 16 November 1993 * column 4, line 55 - column 7, line 21; figures 1,2 * -----	9 10,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H01L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 September 1995	Examiner Bolder, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid,
namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions,
namely:

- see sheet B -

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid,
namely claims:
- ☐ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims,
namely claims:



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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims 1-8 : Heat treatment method and device including posture changing of the objects from vertical to horizontal.
2. Claims 9-11 : Heat treatment device including clean air circulating units.